

# Glossary Of Terms

The following glossary defines often used terms and acronyms that are found in industry. Many of the definitions are not yet standardized. Our intent is that this glossary augments your knowledge and understanding of control and connectivity technologies.

## A-A-A

**ActiveX** - Microsoft's Windows-specific non-Java technique for writing applets. ActiveX applets take considerably longer to download than the equivalent Java applets; however, they more fully exploit the features of Windows 95. ActiveX is sometimes said to be a superset of Java. See also applet, Java.

**ADCCP** - Advanced Data Communications Control Protocol. ANSI standard bit-oriented data link control protocol.

**address** - Data structure or logical convention used to identify a unique entity, such as a particular process or network device.

**address mapping** - Technique that allows different protocols to interoperate by translating addresses from one format to another. For example, when routing IP over X.25, the IP addresses must be mapped to the X.25 addresses so that the IP packets can be transmitted by the X.25 network. See also address resolution.

**address mask** - Bit combination used to describe which portion of an address refers to the network or subnet and which part refers to the host. Sometimes referred to simply as mask.

**AIO** - Asynchronous input/output.

**alarm** - SNMP message notifying an operator or administrator of a network problem. See also event and trap.

**algorithm** - Well-defined rule or process for arriving at a solution to a problem. In networking, algorithms are commonly used to determine the best route for traffic from a particular source to a particular destination.

**Analog** - A voltage, current, or resistance level that is analogous to a continuous value (such as pressure, temperature, velocity).

**anonymous FTP** - Allows a user to retrieve documents, files, programs, and other archived data from anywhere on the Internet without having to establish a userid and password. By using the special userid of anonymous, the network user will bypass local security checks and will have access to publicly accessible files on the remote system.

**ANSI** - American National Standards Institute. Voluntary organization composed of corporate, government, and other members that coordinates standards-related activities, approves U.S. national standards, and develops positions for the United States in international standards organizations. ANSI helps develop international and U.S. standards relating to, among other things, communications and networking. ANSI is a member of the IEC and the ISO.

**API** - Application Programming Interface. Specification of function-call conventions that defines an interface to a service.

**applet** - Small program, often used in the context of a Java-based program, that is compiled and

**ARPANET** - Advanced Research Projects Agency Network. Landmark packet-switching network established in 1969. ARPANET was developed in the 1970s by BBN and funded by ARPA (and later DARPA). It eventually evolved into the Internet. The term ARPANET was officially retired in 1990.

**Array** - A set of similar variables referenced, in a program, by a name and a numerical index into the set.

**ASCII** - American Standard Code for Information Interchange. 8-bit code for character representation (7 bits plus parity).

**ATP** - AppleTalk Transaction Protocol. Transport-level protocol that provides a loss-free transaction service between sockets. The service allows exchanges between two socket clients in which one client requests the other to perform a particular task and to report the results. ATP binds the request and response together to ensure the reliable exchange of request-response pairs.

## **B-B-B**

**backbone** - Part of a network that acts as the primary path for traffic that is most often sourced from, and destined for, other networks.

**backplane** - Physical connection between an interface processor or card and the data buses and the power distribution buses inside a chassis.

**bandwidth** - Difference between the highest and lowest frequencies available for network signals. The term is also used to describe the rated throughput capacity of a given network medium or protocol.

**bandwidth reservation** - Process of assigning bandwidth to users and applications served by a network. Involves assigning priority to different flows of traffic based on how critical and delay-sensitive they are. This makes the best use of available bandwidth, and if the network becomes congested, lower-priority traffic can be dropped. Sometimes called bandwidth allocation.

**baseband** - Characteristic of a network technology where only one carrier frequency is used. Ethernet is an example of a baseband network. Also called narrowband. Essentially opposite of broadband.

**baud** - Unit of signaling speed equal to the number of discrete signal elements transmitted per second. Baud is synonymous with bits per second (bps) if each signal element represents exactly 1 bit.

**BICI** - Broadband Inter-Carrier Interface. ITU-T standard that defines the protocols and procedures needed for establishing, maintaining, and terminating broadband switched virtual connections between public networks.

**binary** - Having exactly two states, such as true and false. Also, numbering system characterized by ones and zeros (1=on, 0=off).

**BinHex** - Binary Hexadecimal. Method for converting binary files into ASCII for transmission by applications, such as e-mail, that can only handle ASCII.

**biphase coding** - Bipolar coding scheme originally developed for use in Ethernet. Clocking information is embedded into and recovered from the synchronous data stream without the need for separate clocking leads. The biphase signal contains no direct current energy.

**bipolar** - Electrical characteristic denoting a circuit with both negative and positive polarity.

**BISDN** - Broadband ISDN. ITU-T communication standards designed to handle high-bandwidth applications such as video. BISDN currently uses ATM technology over SONET-based transmission circuits to provide data rates from 155 to 622 Mbps and beyond.

**bisync** - Binary Synchronous Communication Protocol. Character-oriented data-link protocol for applications. Contrast with Synchronous Data Link Control (SDLC).

**bit** - Binary digit used in the binary numbering system. Can be 0 or 1.

**bit rate** - Speed at which bits are transmitted, usually expressed in bits per second (bps)

**Boolean** - Logic named for George Boole, English mathematician and philosopher. In this form of logic, values have two states (true or false, on or off, etc.). Computers use Boolean logic to perform virtually all computation.

**BOOTP** - Bootstrap Protocol. Protocol used by a network node to determine the IP address of its Ethernet interfaces, in order to affect network booting.

**bps** - bits per second.

**Breakpoint** - A place in a software program where the debugger may temporarily halt so that the developer can inspect the code.

**bridge** - Device that connects and passes packets between two network segments that use the same communications protocol. Bridges operate at the data link layer (Layer 2) of the OSI reference model. In general, a bridge will filter, forward, or flood an incoming frame based on the MAC address of that frame.

**broadband** - 1. Transmission system that multiplexes multiple independent signals onto one cable. 2. Telecommunications terminology: Any channel having a bandwidth greater than a voice-grade channel (4 kHz). 3. LAN terminology: A coaxial cable on which analog signaling is used. Also called wideband.

**broadcast** - Data packet that will be sent to all nodes on a network. Broadcasts are identified by a broadcast address. Compare with multicast and unicast.

**browser** - GUI-based hypertext client application, such as Internet Explorer, Mosaic, and Netscape Navigator, used to access hypertext documents and other services located on innumerable remote servers throughout the WWW and Internet.

**BSC** - binary synchronous communication. Character-oriented data link layer protocol for half-duplex applications. A form of telecommunication line control that uses a standard set of transmission control



characters and control character sequences, for binary synchronous transmission of binary-coded data between stations.

**buffer** - In software terms, a place to store data temporarily as it is transferred from one place to another, such as from a serial port to memory.

**Bus** - A parallel group of signals (wires) that communicate among procesors. The data bus and address bus carry data and address bits to components on a board.

**byte** - An 8-bit value (8 bits equals one byte). A byte is one storage element. A byte generally stores exactly one character when the information is text.

## C-C-C

**caching** - Form of replication in which information learned during a previous transaction is used to process later transactions.

**cage** - Piece of hardware into which cards are installed.

**CBDS** - Connectionless Broadband Data Service. European high-speed, packet-switched, datagram-based WAN networking technology.

**CD** - Carrier Detect. Signal that indicates whether an interface is active. Also, a signal generated by a modem indicating that a call has been connected.

**CDPD** - Cellular Digital Packet Data. Open standard for two-way wireless data communication over high-frequency cellular telephone channels. Allows data transmissions between a remote cellular link and a NAP. Operates at 19.2 Kbps.

**CGI** - Common Gateway Interface. Set of rules that describe how a Web server communicates with another application running on the same computer and how the application (called a CGI program) communicates with the Web server. Any application can be a CGI program if it handles input and output according to the CGI standard.

**Channel** - An addressable wire (or set of wires) through which data may be input or output, serially or in parallel.

**CHAP** - Challenge Handshake Authentication Protocol. Security feature supported on lines using PPP encapsulation that prevents unauthorized access. CHAP does not itself prevent unauthorized access, it merely identifies the remote end. The router or access server then determines whether that user is allowed access.

**checksum** - Method for checking the integrity of transmitted data. A checksum is an integer value computed from a sequence of octets taken through a series of arithmetic operations. The value is recomputed at the receiving end and compared for verification.

**CIX** - Commercial Internet Exchange. A connection point between the commercial Internet service providers. Pronounced "kicks."

**CLI** - Command line interface. Interface that allows the user to interact with the operating system by entering commands and optional arguments. The UNIX operating system and DOS provide CLIs.

**client** - Node or software program (front-end device) that requests services from a server.

**client/server computing** - Term used to describe distributed computing (processing) network



systems in which transaction responsibilities are divided into two parts: client (front end) and server (back end). Both terms (client and server) can be applied to software programs or actual computing devices. Also called distributed computing (processing).

**client-server model** - Common way to describe network services and the model user processes (programs) of those services. Examples include the nameserver/nameresolver paradigm of the DNS and fileserver/file-client relationships such as NFS and diskless hosts.

**CLNP** - Connectionless Network Protocol. OSI network layer protocol that does not require a circuit to be established before data is transmitted.

**CLNS** - Connectionless Network Service. OSI network layer service that does not require a circuit to be established before data is transmitted. CLNS routes messages to their destinations independently of any other messages.

**coaxial cable** - Cable consisting of a hollow outer cylindrical conductor that surrounds a single inner wire conductor. Two types of coaxial cable are currently used in LANs: 50-ohm cable, which is used for digital signaling, and 75-ohm cable, which is used for analog signaling and high-speed digital signaling.

**collision** - In Ethernet, the result of two nodes transmitting simultaneously. The frames from each device impact and are damaged when they meet on the physical media.

**collision domain** - In Ethernet, the network area within which frames that have collided are propagated. Repeaters and hubs propagate collisions; LAN switches, bridges and routers do not.

**Compiler** - A programming tool that translates the text of your program into instructions that a device (single-board computer) can execute.

**Condition** - Programming term for an expression that evaluates true or false. Decisions (affecting the flow of your program) are made on the basis of conditions.

**Constant** - A value in a software program that never changes, as opposed to a variable which can change.

**cookie** - Piece of information sent by a Web server to a Web browser that the browser is expected to save and send back to the Web server whenever the browser makes additional requests of the Web server.

**core router** - In a packet-switched star topology, a router that is part of the backbone and that serves as the single pipe through which all traffic from peripheral networks must pass on its way to other peripheral networks.

**CoS** - class of service. Indication of how an upper-layer protocol requires a lower-layer protocol to treat its messages. In SNA subarea routing, COS definitions are used by subarea nodes to determine the optimal route to establish a given session. A COS definition comprises a virtual route number and a transmission priority field. Also called ToS.

**cross talk** - Interfering energy transferred from one circuit to another.

**CTS** - 1. Clear To Send. Circuit in the EIA/TIA-232 specification that is activated when DCE is ready to accept data from a DTE. 2. common transport semantic. Cornerstone of the IBM strategy to reduce the number of protocols on networks. CTS provides a single API for developers of network software and enables applications to run over APPN, OSI, and TCP/IP.

## D-D-D

**database object** - Piece of information that is stored in a database.

**data bus connector** - common connector for interfacing 2 devices over wire. Often referred to as DB connector.

**data stream** - All data transmitted through a communications line in a single read or write operation.

**DB connector** - data bus connector. Type of connector used to connect serial and parallel cables to a data bus. DB connectors are defined by various EIA/TIA standards.

**Debounce** - When switches close, the contacts tend to bounce apart rapidly several times before coming to rest. Filtering out the bounces is called debouncing.

**Debugging** - Finding and removing errors (bugs) from a software program.

**Declaration** - A definition, in a software program, of a variable, function, or constant. Declarations include specifications of name, type, size, and storage class.

**dedicated LAN** - Network segment allocated to a single device. Used in LAN switched network topologies.

**demodulation** - Process of returning a modulated signal to its original form. Modems perform demodulation by taking an analog signal and returning it to its original (digital) form.

**destination address** - Address of a network device that is receiving data.

**DHCP** - Dynamic Host Configuration Protocol. Provides a mechanism for allocating IP addresses dynamically so that addresses can be reused when hosts no longer need them.

**Digital** - Comprised of digits. Virtually all microprocessors operate on values composed of bits (binary digits) from which we get the term digital.

**DMA** - direct memory access. Transfer of data from a peripheral device, such as a hard disk drive, into memory without that data passing through the microprocessor. DMA transfers data into memory at high speeds with no processor overhead.

**domain** - A portion of the naming hierarchy tree in the internet that refers to general groupings of networks based on organization-type or geography.

**DRAM** - dynamic random-access memory. RAM that stores information in capacitors that must be periodically refreshed. Delays can occur because DRAMs are inaccessible to the processor when refreshing their contents. However, DRAMs are less complex and have greater capacity than SRAMs. See also SRAM.

**DSL** - digital subscriber line. Public network technology that delivers high bandwidth over conventional copper wiring at limited distances. There are four types of DSL: ADSL, HDSL, SDSL, and VDSL. All are provisioned via modem pairs, with one modem located at a central office and the other at the customer site. Because most DSL technologies do not use the whole bandwidth of the twisted pair, there is room remaining for a voice channel.

**DSP** - domain specific part. Part of an NSAP-format ATM address that contains an area identifier, a station identifier, and a selector byte.

**DSR** - data set ready. EIA/TIA-232 interface circuit that is activated when DCE is powered up and

ready for use.

**DTE** - data terminal equipment. Device at the user end of a user-network interface that serves as a data source, destination, or both. DTE connects to a data network through a DCE device (for example, a modem) and typically uses clocking signals generated by the DCE. DTE includes such devices as computers, protocol translators, and multiplexers.

**DTR** - data terminal ready. EIA/TIA-232 circuit that is activated to let the DCE know when the DTE is ready to send and receive data.

### E-E-E

**EDI** - electronic data interchange. Electronic communication of operational data such as orders and invoices between organizations.

**Editor** - A programming tool by which a software developer edits the text (code) of a software program.

**EEPROM** - electrically erasable programmable read-only memory. EPROM that can be erased using electrical signals applied to specific pins. Most often used to hold small sets of infrequently accessed parameters.

**EIA** - Electronic Industries Association. Group that specifies electrical transmission standards. The EIA and TIA have developed numerous well-known communications standards, including EIA/TIA-232 and EIA/TIA-449.

**EISA** - Extended Industry-Standard Architecture. 32-bit bus interface used in PCs, PC-based servers, and some UNIX workstations and servers.

**Embedded Computer** - A computer that is embedded in a larger system and controls that system. Often a single circuit board with a control program in ROM.

**EMI** - electromagnetic interference. Interference by electromagnetic signals that can cause reduced data integrity and increased error rates on transmission channels.

**encryption** - Application of a specific algorithm to data so as to alter the appearance of the data making it incomprehensible to those who are not authorized to see the information.

**EPROM** - erasable programmable read-only memory. Nonvolatile memory chips that are programmed after they are manufactured, and, if necessary, can be erased by some means and reprogrammed. Compare with EECM and PROM.

**ESD** - electrostatic discharge. Discharge of stored static electricity that can damage electronic equipment and impair electrical circuitry, resulting in complete or intermittent failures.

**Ethernet** - Baseband LAN specification invented by Xerox Corporation and developed jointly by Xerox, Intel, and Digital Equipment Corporation. Ethernet networks use CSMA/CD and run over a variety of cable types at 10 Mbps. Ethernet is similar to the IEEE 802.3 series of standards. See also 10Base2, 10Base5, 10BaseF, 10BaseT, 10Broad36, Fast Ethernet, and IEEE 802.3.

**Expression** - A phrase in C language comprising variable names, constants, functions and operators that expresses a value.

### F-F-F



**FAQ** - frequently asked questions. Usually appears in the form of a "read-me" file in a variety of Internet forums. New users are expected to read the FAQ before participating in newsgroups, bulletin boards, video conferences, and so on.

**False** - Logical opposite of true. In a program, when a condition is false, the actions governed by the condition will not be performed. In C language programming, false has the value of zero.

**Fast Ethernet** - Any of a number of 100-Mbps Ethernet specifications. Fast Ethernet offers a speed increase ten times that of the 10BaseT Ethernet specification, while preserving such qualities as frame format, MAC mechanisms, and MTU. Such similarities allow the use of existing 10BaseT applications and network management tools on Fast Ethernet networks. Based on an extension to the IEEE 802.3 specification.

**fiber-optic cable** - Physical medium capable of conducting modulated light transmission. Compared with other transmission media, fiber-optic cable is more expensive, but is not susceptible to electromagnetic interference, and is capable of higher data rates. Sometimes called optical fiber.

**file transfer** - Category of popular network applications that allow files to be moved from one network device to another.

**File Transfer Protocol** - Referred to as FTP, allow files transfers between network nodes.

**firewall** - Router or access server, or several routers or access servers, designated as a buffer between any connected public networks and a private network. A firewall router uses access lists and other methods to ensure the security of the private network.

**Flash memory** - Similar to EPROM, but flash can be programmed while it is in a device. It is nonvolatile storage that can be electrically erased and reprogrammed so that software images can be stored, booted, and rewritten as necessary. Flash memory was developed by Intel and is licensed to other semiconductor companies.

**FQDN** - fully qualified domain name. FQDN is the full name of a system, rather than just its host name. For example, aldebaran is a host name, and aldebaran.interop.com is an FQDN.

**frequency** - Number of cycles, measured in hertz, of an alternating current signal per unit time.

**FTP** - File Transfer Protocol. Application protocol, part of the TCP/IP protocol stack, used for transferring files between network nodes. FTP is defined in RFC 959.

**full duplex** - Capability for simultaneous data transmission between a sending station and a receiving station. Compare with half duplex and simplex.

**Function** - A body of text in your program that you can call upon to perform a useful task or function. Functions can also call upon other functions.

## G-G-G

**gateway** - In the IP community, an older term referring to a routing device. Today, the term router is used to describe nodes that perform this function, and gateway refers to a special-purpose device that performs an application layer conversion of information from one protocol stack to another.

**GB** - gigabyte. Approximately 1,000,000,000 bytes.

**GBps** - gigabytes per second.

**Gb** - gigabit. Approximately 1,000,000,000 bits.

**Gbps** - gigabits per second.

**GHz** - gigahertz.

**GIX** - Global Internet eXchange. Common routing exchange point which allows pairs of networks to implement agreed-upon routing policies.

**Global variable** - A program variable accessible by all functions, as opposed to a local variable that can be accessed only by the function in which it is defined.

**GUI** - graphical user interface. User environment that uses pictorial as well as textual representations of the input and output of applications and the hierarchical or other data structure in which information is stored. Conventions such as buttons, icons, and windows are typical, and many actions are performed using a pointing device (such as a mouse). Microsoft Windows and the Apple Macintosh are prominent examples of platforms using a GUI.

## H-H-H

**half duplex** - Capability for data transmission in only one direction at a time between a sending station and a receiving station. BSC is an example of a half-duplex protocol. See also BSC.

**handshake** - Sequence of messages exchanged between two or more network devices to ensure transmission synchronization.

**HDSL** - high-data-rate digital subscriber line. One of four DSL technologies. HDSL delivers 1.544 Mbps of bandwidth each way over two copper twisted pairs. Because HDSL provides T1 speed, telephone companies have been using HDSL to provision local access to T1 services whenever possible. The operating range of HDSL is limited to 12,000 feet (3658.5 meters), so signal repeaters are installed to extend the service. HDSL requires two twisted pairs, so it is deployed primarily for PBX network connections, digital loop carrier systems, interexchange POPs, Internet servers, and private data networks.

**HEPnet** - High-Energy Physics Network. Research network that originated in the United States, but that has spread to most places involved in high-energy physics. Well-known sites include Argonne National Laboratory, Brookhaven National Laboratory, Lawrence Berkeley Laboratory, and the SLAC.

**hertz** - Measure of frequency. Abbreviated Hz. Synonymous with cycles per second.

**host number** - Part of an IP address that designates which node on the subnetwork is being addressed. Also called a host address.

**HTTP** - Hypertext Transfer Protocol. The protocol used by Web browsers and Web servers to transfer files, such as text and graphic files.

**HTML** - Hypertext Markup Language. Simple hypertext document formatting language that uses tags to indicate how a given part of a document should be interpreted by a viewing application, such as a Web browser.

**hub** - Generally, a term used to describe a device that serves as the center of a star-topology network. In Ethernet an Ethernet multiport repeater, sometimes called a concentrator.

**hyperlink** - Pointer within a hypertext document that points (links) to another document, which may or

may not also be a hypertext document.

**hypertext** - Electronically-stored text that allows direct access to other texts by way of encoded links. Hypertext documents can be created using HTML, and often integrate images, sound, and other media that are commonly viewed using a browser.

## I-I-I

**ICMP** - Internet Control Message Protocol. Network layer Internet protocol that reports errors and provides other information relevant to IP packet processing. Documented in RFC 792.

**IEEE** - Institute of Electrical and Electronics Engineers. Professional organization whose activities include the development of communications and network standards. IEEE LAN standards are the predominant LAN standards today.

**IGP** - Interior Gateway Protocol. Internet protocol used to exchange routing information within an autonomous system.

**IMAP** - Internet Message Access Protocol. Method of accessing e-mail or bulletin board messages kept on a mail server that can be shared. IMAP permits client electronic mail applications to access remote message stores as if they were local without actually transferring the message.

**Internet** - Largest global internetwork, connecting tens of thousands of networks worldwide and having a "culture" that focuses on research and standardization based on real-life use. Many leading-edge network technologies come from the Internet community. The Internet evolved in part from ARPANET. At one time, called the DARPA Internet. Not to be confused with the general term internet.

**Internet Protocol (IP, IPv4)** - Network layer for the TCP/IP protocol suite. Internet Protocol (version 4) is a connectionless, best-effort packet switching protocol.

**InterNIC** - Organization that serves the Internet community by supplying user assistance, documentation, training, registration service for Internet domain names, and other services. Formerly called NIC.

**I/O** - input/output.

**IP** - Internet Protocol. Network layer protocol in the TCP/IP stack offering a connectionless internetwork service. IP provides features for addressing, type-of-service specification, fragmentation and reassembly, and security.

**IP address** - 32-bit address assigned to hosts using TCP/IP. An IP address belongs to one of five classes (A, B, C, D, or E) and is written as 4 octets separated by periods (dotted decimal format). Each address consists of a network number, an optional subnetwork number, and a host number. The network and subnetwork numbers together are used for routing, while the host number is used to address an individual host within the network or subnetwork. A subnet mask is used to extract network and subnetwork information from the IP address.

**ISDN** - Integrated Services Digital Network. Communication protocol, offered by telephone companies, that permits telephone networks to carry data, voice, and other source traffic.

## J-J-J

**Java** - Object-oriented programming language developed at Sun Microsystems to solve a number of problems in modern programming practice. The Java language is used extensively on World-Wide Web, particularly for applets.



**JPEG** - Joint Photographics Expert Group. Graphic file format that was adopted as a standard by the ITU-T and the ISO. JPEG is most often used to compress still images using DCT analysis.

### K-K-K

**KB** - kilobyte. Approximately 1,000 bytes.

**Kb** - kilobit. Approximately 1,000 bits.

**kBps** - kilobytes per second.

**kbps** - kilobits per second.

**Kermit** - Popular file-transfer and terminal-emulation program.

### L-L-L

**LAN** - Local-area network. High-speed, low-error data network covering a relatively small geographic area (up to a few thousand meters). LANs connect workstations, peripherals, terminals, and other devices in a single building or other geographically limited area. LAN standards specify cabling and signaling at the physical and data link layers of the OSI model. Ethernet, FDDI, and Token Ring are widely used LAN technologies.

**latency** - Delay between the time a device requests access to a network and the time it is granted permission to transmit.

**LED** - light emitting diode. Semiconductor device that emits light produced by converting electrical energy. Status lights on hardware devices are typically LEDs.

**line driver** - Inexpensive amplifier and signal converter that conditions digital signals to ensure reliable transmissions over extended distances.

**LLAP** - LocalTalk Link Access Protocol. Link-level protocol that manages node-to-node delivery of data on a LocalTalk network. LLAP manages bus access, provides a node-addressing mechanism, and controls data transmission and reception, ensuring packet length and integrity.

**local bridge** - Bridge that directly interconnects networks in the same geographic area.

### M-M-M

**MB** - megabyte. Approximately 1,000,000 bytes.

**Mb** - megabit. Approximately 1,000,000 bits.

**Mbps** - megabits per second.

**MIME** - Multipurpose Internet Mail Extension. MIME. Standard for transmitting non-text data (or data that cannot be represented in plain ASCII code) in Internet mail, such as binary, foreign language text (such as Russian or Chinese), audio, or video data.

**mips** - millions of instructions per second. Number of instructions executed by a processor per second.

**modem** - modulator-demodulator. Device that converts digital and analog signals. At the source, a modem converts digital signals to a form suitable for transmission over analog communication facilities. At the destination, the analog signals are returned to their digital form. Modems allow data to be transmitted over voice-grade telephone lines.

**Modbus** - A widely used software protocol by which diverse products may communicate over a serial network.

**Mosaic** - Public-domain WWW browser, developed at the NCSA. See also browser.

**MTBF** - meantime between failure.

**multidrop line** - Communications line with multiple cable access points. Sometimes called a multipoint line.

**multiplexing** - Scheme that allows multiple logical signals to be transmitted simultaneously across a single physical channel. Compare with demultiplexing.

**Multitasking** - A programming technique in which a program consists of several tasks that operate independently and often asynchronously.

### N-N-N

**NAP** - network access point. Location for interconnection of Internet service providers in the United States for the exchange of packets.

**NetBIOS** - Network Basic Input/Output System. API used by applications on an IBM LAN to request services from lower-level network processes. These services might include session establishment and termination, and information transfer.

**NIC** - Network interface card. Board that provides network communication capabilities to and from a computer system. Also called an adapter. See also AUI.2. Network Information Center. Organization whose functions have been assumed by the InterNIC. See InterNIC.

**null modem** - Small box or cable used to join computing devices directly, rather than over a network.

**NVRAM** - nonvolatile RAM. RAM that retains its contents when a unit is powered off.

### O-O-O

**octet** - 8 bits. In networking, the term octet is often used (rather than byte) because some machine architectures employ bytes that are not 8 bits long.

### P-P-P

**packet** - Logical grouping of information that includes a header containing control information and (usually) user data. Packets are most often used to refer to network layer units of data. The terms datagram, frame, message, and segment are also used to describe logical information groupings at various layers of the OSI reference model and in various technology circles. See also PDU.

**parity check** - Process for checking the integrity of a character. A parity check involves appending a bit that makes the total number of binary 1 digits in a character or word (excluding the parity bit) either odd (for odd parity) or even (for even parity).

**PIO** - Short for parallel I/O (input and output).

**polling** - Access method in which a primary network device inquires, in an orderly fashion, whether secondaries have data to transmit. The inquiry occurs in the form of a message to each secondary that gives the secondary the right to transmit.

**Port** - An addressable wire or set of wires through which data may be input or output, either serially or in parallel.

**PPP** - Point-to-Point Protocol. Successor to SLIP that provides router-to-router and host-to-network connections over synchronous and asynchronous circuits. Whereas SLIP was designed to work with IP, PPP was designed to work with several network layer protocols, such as IP, IPX, and ARA. PPP also has builtin security mechanisms, such as CHAP and PAP. PPP relies on two protocols: LCP and NCP.

**PROM** - programmable read-only memory. ROM that can be programmed using special equipment. PROMs can be programmed only once. Compare with EPROM.

**propagation delay** - Time required for data to travel over a network, from its source to its ultimate destination.

**protocol** Formal description of a set of rules and conventions that govern how devices on a network exchange information.

### Q-Q-Q

**query** - Message used to inquire about the value of some variable or set of variables.

**queue** - Generally, an ordered list of elements waiting to be processed.

### R-R-R

**RAM** - random-access memory. Volatile memory that can be read and written by a microprocessor.

**ring topology** - Network topology that consists of a series of repeaters connected to one another by unidirectional transmission links to form a single closed loop. Each station on the network connects to the network at a repeater. While logically a ring, ring topologies are most often organized in a closed-loop star.

**RJ connector** - registered jack connector. Standard connectors originally used to connect telephone lines. RJ connectors are now used for telephone connections and for 10BaseT and other types of network connections. RJ-11, RJ-12, and RJ-45 are popular types of RJ connectors.

**rlogin** - remote login. Terminal emulation program, similar to Telnet, offered in most UNIX implementations.

**ROM** - read-only memory. Storage for programs and constants. Nonvolatile memory that can be read, but not written, by the microprocessor.

**router** - Network layer device that uses one or more metrics to determine the optimal path along which network traffic should be forwarded. Routers forward packets from one network to another based on network layer information.

**RS-422** - Balanced electrical implementation of EIA/TIA-449 for high-speed data transmission.



**RS-232** - EIA's standard for short-range, two-point serial communications up to 50 feet.

## S-S-S

**sampling rate** - Rate at which samples of a particular waveform amplitude are taken.

**SDSL** - single-line digital subscriber line. One of four DSL technologies. SDSL delivers 1.544 Mbps both downstream and upstream over a single copper twisted pair. The use of a single twisted pair limits the operating range of SDSL to 10,000 feet (3048.8 meters).

**serial transmission** - Method of data transmission in which the bits of a data character are transmitted sequentially over a single channel.

**server** - Node or software program that provides services to clients.

**SMTP** - Simple Mail Transfer Protocol. Internet protocol providing e-mail services.

**SNA** - Systems Network Architecture. Large, complex, feature-rich network architecture developed in the 1970s by IBM. SNA is essentially composed of seven layers.

**SNA Distribution Services** See SNADS.

**SNMP** - Simple Network Management Protocol. Network management protocol used almost exclusively in TCP/IP networks. SNMP provides a means to monitor and control network devices, and to manage configurations, statistics collection, performance, and security.

**socket** - Software structure operating as a communications end point within a network device.

**SQL** - Structured Query Language. International standard language for defining and accessing relational databases.

**SRAM** - Static, as opposed to dynamic, RAM. Type of RAM that retains its contents for as long as power is supplied. SRAM does not require constant refreshing, like DRAM.

**Symbolic Debugger** - Also known as source-level debugger, a debugger that communicates in the terms of a high-level language, as opposed to a machine- or assembly-level debugger.

## T-T-T

**T1** - Digital WAN carrier facility. T1 transmits DS-1-formatted data at 1.544 Mbps through the telephone-switching network, using AMI or B8ZS coding.

**T3** - Digital WAN carrier facility. T3 transmits DS-3-formatted data at 44.736 Mbps through the telephone switching network.

**TCP** - Transmission Control Protocol. Connection-oriented transport layer protocol that provides reliable full-duplex data transmission. TCP is part of the TCP/IP protocol stack.

**TCP/IP** - Transmission Control Protocol/Internet Protocol. Common name for the suite of protocols developed by the U.S. DoD in the 1970s to support the construction of worldwide internetworks. TCP and IP are the two best-known protocols in the suite.

**Telnet** - Standard terminal emulation protocol in the TCP/IP protocol stack. Telnet is used for remote

terminal connection, enabling users to log in to remote systems and use resources as if they were connected to a local system.

**terminal** - Simple device at which data can be entered or retrieved from a network. Generally, terminals have a monitor and a keyboard, but no processor or local disk drive.

**terminal emulation** - Network application in which a computer runs software that makes it appear to a remote host as a directly attached terminal.

**terminal server** - Communications processor that connects asynchronous devices such as terminals, printers, hosts, and modems to any LAN or WAN that uses TCP/IP, X.25, or LAT protocols.

**TFTP** - Trivial File Transfer Protocol. Simplified version of FTP that allows files to be transferred from one computer to another over a network.

**Touchscreen** - A display, usually an LCD, which has a matrix of transparent keys overlaid on it.

**True** - Opposite of false. In a software program, when a condition is true, the actions governed by the condition will be performed. In C, true is implied by a non-zero value.

**TTL** - Transistor-transistor-logic. A logic signal whose "high" state is nominally 5 volts and at least 2 volts at less than 20mA, and whose "low" state is nominally 0 volts and less than 0.8 volts.

**twisted pair** - Relatively low-speed transmission medium consisting of two insulated wires arranged in a regular spiral pattern. The wires can be shielded or unshielded. Twisted pair is common in telephony applications and is increasingly common in data networks.

## U-U-U

**UART** - Universal Asynchronous Receiver/Transmitter. Integrated circuit, attached to the parallel bus of a computer, used for serial communications. The UART translates between serial and parallel signals, provides transmission clocking, and buffers data sent to or from the computer.

**UIO** - Universal I/O serial port

**unipolar** - Literally meaning one polarity, the fundamental electrical characteristic of internal signals in electronic equipment.

**UNIX** - Operating system developed in 1969 at Bell Laboratories. UNIX has gone through several iterations since its inception.

**URL** - Universal Resource Locator. Standardized addressing scheme for accessing hypertext documents and other services using a browser.

## V-V-V

**Variable** - A value in a software program that can change and is expected to change, as opposed to a constant.

**VDSL** - very-high-data-rate digital subscriber line. One of four DSL technologies. VDSL delivers 13 to 52 Mbps downstream and 1.5 to 2.3 Mbps upstream over a single twisted copper pair. The operating range of VDSL is limited to 1,000 to 4,500 feet (304.8 to 1,372 meters).

**VRML** - Virtual Reality Modeling Language. Specification for displaying 3-dimensional objects on the World Wide Web. Think of it as the 3-D equivalent of HTML.

**W-W-W-**

**WAN** - wide-area network. Data communications network that serves users across a broad geographic area and often uses transmission devices provided by common carriers. Frame Relay, SMDS, and X.25 are examples of WANs.

**watchdog timer** - An independent safety device (timer) that will reset if software does not periodically reset it. It is a mechanism (hardware or software) that is used to trigger an event or an escape from a process unless the timer is periodically reset.

**X-X-X**

**XML** - eXtensible Markup Language. Text markup language designed to enable the use of SGML on the World-Wide Web. XML allows you to define your own customized markup language.

**Numeric Terms**

**10Base2** - 10-Mbps baseband Ethernet specification using 50-ohm thin coaxial cable. 10Base2 has a distance limit of 606.8 feet (185 meters) per segment.

**10BaseT** - 10-Mbps baseband Ethernet specification using two pairs of twisted-pair cabling (Category 3, 4, or 5): one pair for transmitting data and the other for receiving data. 10BaseT has a distance limit of approximately 328 feet (100 meters) per segment.

**100BaseT** - 100-Mbps baseband Fast Ethernet specification using UTP wiring. Like the 10BaseT technology on which it is based, 100BaseT sends link pulses over the network segment when no traffic is present. However, these link pulses contain more information than those used in 10BaseT.

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